

What We Claim Is:

1. A polyester polymer particle comprising a polyester polymer comprising:
(a) a carboxylic acid component comprising at least 90 mole% of the residues
of terephthalic acid, derivatives of terephthalic acid, naphthalene-2,6-
5 dicarboxylic acid, derivatives of naphthalene-2,6-dicarboxylic acid, or mixtures
thereof, and
(b) a hydroxyl component comprising at least 90 mole% of the residues of
ethylene glycol,
based on 100 mole percent of the carboxylic acid component residues and 100 mole
10 percent hydroxyl component residues in the polyester polymer, wherein said particle
has an It.V. of at least 0.70 dL/g , and the It.V. at the surface of the particle is less
than 0.25 dL/g higher than the It.V. at the center of the particle.
2. The particle of claim 1, wherein the particle has an It.V. of at least 0.74
dL/g.
- 15 3. The particle of claim 2, wherein the particle has an It.V. of at least 0.77
dL/g.
4. The particle of claim 2, wherein the It.V at the surface of the particle is less
than 0.2 dL/g higher than the It.V. at the center of the particle.
5. The particle of claim 1, wherein the It.V. at the surface of the particle is
20 less than 0.15 dL/g higher than the It.V. at the center of the particle.
6. The particle of claim 1, wherein the particle has a degree of crystallinity of
at least 25%.
7. The particle of claim 1, wherein the particle contains less than 10 ppm
acetaldehyde.
- 25 8. Polyester particles having a number average weight of at least 1.0 g per
100 particles, wherein each particle is the polyester particle of claim 1.
9. The polyester particle of claim 1, wherein said polyester particle is a virgin
polyester polymer.
10. The polyester particle of claim 1, wherein the polyester polymer contains
30 at least:

(a) a carboxylic acid component comprising at least 92 mole% of the residues of terephthalic acid, or derivatives of terephthalic acid, or mixtures thereof, and

(b) a hydroxyl component comprising at least 92 mole% of the residues of ethylene glycol,

5 based on 100 mole percent of the polycarboxylic acid component residues and 100 mole percent hydroxyl component residues in the polyester polymer.

11. The particle of claim 1, wherein the It.V. of the particle at the surface does not vary from the It.V. of the particle at its center by more than 0.10 dL/g.

10 12. The particle of claim 11, wherein the It.V. of the particle at the surface does not vary from the It.V. of the particle at its center by more than 0.20 dL/g.

13. The particle of claim 11, wherein the polyester polymer contains at least:

(a) a carboxylic acid component comprising at least 96 mole% of the residues of terephthalic acid, or derivatives of terephthalic acid, or mixtures thereof, and

15 (b) a hydroxyl component comprising at least 96 mole% of the residues of ethylene glycol,

based on 100 mole percent of the carboxylic acid component residues and 100 mole percent hydroxyl component residues in the polyester polymer.

14. The particle of claim 13, wherein the particle has a degree of crystallinity of at least 25%.

20 15. The particle of claim 1, comprising a bulk of said particles having a volume of at least 1 cubic meter.

16. The particle of claim 15, wherein the It.V. average of the differences between the It.V. of the surface of the particles and the It.V. of the center of the particles in the bulk is not greater than 0.20 dL/g.

25 17. The particle of claim 16, wherein the It.V. average of the differences is not greater than 0.10 dL/g.

18. A blow molded container obtained from the polyester polymer particles of any one of claims 1 through 17.

19. A beverage bottle obtained from the polyester polymer particles of claim 1.

30 20. A polyester particle having a degree of crystallinity of at least 25% and an It.V. of at least 0.70 dL/g, said particle having an It.V. at its surface and an It.V. at its

center, wherein the It.V. at the surface of the particle is less than 0.25 dL/g higher than the It.V. at the center of the particle.

21. The particle of claim 20, wherein the polyester polymer contains:

5 (a) a carboxylic acid component comprising at least 90 mole% of the residues of terephthalic acid, or derivatives of terephthalic acid, or mixtures thereof, and

(b) a hydroxyl component comprising at least 90 mole% of the residues of ethylene glycol,

based on 100 mole percent of the carboxylic acid residues and 100 mole percent hydroxyl residues in the polyester polymer.

10 22. The polyester particle of claim 21, wherein the degree of crystallinity is at least 35%, and the It.V. of the particle is at least 0.74 dL/g.

23. The polyester particle of claim 21, wherein the difference between the It.V. of the particle at its surface and its center is 0.15 dL/g or less.

15 24. The polyester particle of claim 23, wherein the difference is 0.05 dL/g or less.

25. A blow molded container obtained from the polyester particles of claim 1 having an degree of crystallinity of at least 35%, and an It.V. of at least 0.77 dL/g, said blow molded container obtained without increasing the molecular weight of the pellets by solid state polymerization.

20 26. A process for making a container from a polyester(s) polymer, comprising feeding polyester particles having a degree of crystallinity of at least 15% and an It.V. of at least 0.70 dL/g to an extrusion zone, melting the particles in the extrusion zone to form a molten polyester polymer composition, and forming a sheet or a molded part from extruded molten polyester polymer, wherein the polyester particles
25 fed to the extrusion zone have an It.V. at their surface which is less than 0.25 dL/g higher than the It.V. at their center.

27. The process of claim 26, wherein the It.V. at the surface of the particles is less than 0.20 dL/g higher than the It.V. at the center of the particles.

30 28. The process of claim 27, wherein the difference between the It.V. of the particles at their surface and their center is 0.10 dL/g or less.

29. The process of claim 28, wherein the difference is 0.05 dL/g or less.

30. The process of claim 26, wherein the molded part is a container preform.

31. The process of claim 30, comprising stretch blow molding the preform into a beverage container.

5 32. The process of claim 31, wherein the container has a volume of 3 liters or less.

33. The process of claim 27, comprising drying the particles in a drying zone at temperature of at least 140°C before melting the particles in the extrusion zone.

34. The process of claim 26, further comprising drying the particles before feeding the particles to the extrusion zone, wherein the particles are not solid state
10 polymerized before drying.

35. The process of claim 34, wherein the particles have an acetaldehyde level of 10 ppm or less prior to melting in the extrusion zone.

36. The process of claim 26, wherein the polyester polymer particles comprise:

15 (a) a carboxylic acid component comprising at least 90 mole% of the residues of terephthalic acid, or derivatives of terephthalic acid, or mixtures thereof, and

(b) a hydroxyl component comprising at least 90 mole% of the residues of ethylene glycol,
based on 100 mole percent of the carboxylic acid component residues and 100 mole
20 percent hydroxyl component residues in the polyester polymer, and at least 75% of the polyester polymer is virgin polymer.

37. The process of claim 36, wherein the polyester polymer particles comprises:

25 (a) a carboxylic acid component comprising at least 92 mole% of the residues of terephthalic acid, or derivatives of terephthalic acid, or mixtures thereof, and

(b) a hydroxyl component comprising at least 92 mole% of the residues of ethylene glycol,
based on 100 mole percent of the carboxylic acid component residues and 100 mole
percent hydroxyl component residues in the polyester polymer.

30 38. The process of claim 37, wherein the degree of crystallinity is at least 25%.

39. The process of claim 26, wherein the degree of crystallinity is at least 35%.

40. The process of claim 26, comprising a bulk of said particles having a volume of at least 1 cubic meter.

5 41. The particle of claim 40, wherein the It.V. average of the differences between the It.V. of the surface of the particles and the It.V. of the center of the particles in the bulk is not greater than 0.20 dL/g.

42. The particle of claim 41, wherein the It.V. average of the differences is not greater than 0.10 dL/g.

10 43. A blow molded container obtained from the particles of claim 26.

44. A preform obtained from the particles of claim 26.

45. Polyester particles having a particle weight of greater than 1.0 g per 100 particles and less than 100 g per 100 particles, said particles, comprising at least 75% virgin polyester polymer, comprising:

15 (a) a carboxylic acid component comprising at least 90 mole% of the residues of terephthalic acid, or derivatives of terephthalic acid, or mixtures thereof, and

(b) a hydroxyl component comprising at least 90 mole% of the residues of ethylene glycol,

based on 100 mole percent of the carboxylic acid component residues and 100 mole percent hydroxyl component residues in the polyester polymer, the particles having a degree of crystallinity of at least 25%, an It.V. of at least 0.77 dL/g, an It.V. at their surface and an It.V. at their center wherein the It.V. at the surface of the particles is not greater than 0.15 dL/g higher than the It.V. at the center of the particles, and having an acetaldehyde level of 10 ppm or less.

25 46. The particles of claim 45, wherein the particles comprise a bulk having a volume of at least 1.0 cubic meter.

47. The particles of claim 46, wherein in the It.V. average of the differences between the It.V. of the surface of the particles and the It.V. of the center of the particles in the bulk is not greater than 0.15 dL/g.

30 48. The particles of claim 47, wherein the It.V. average of the differences is not greater than 0.10 dL/g.

49. The particles of claim 48, wherein the It.V. average is not greater than 0.05 dL/g.

50. A blow molded container obtained from the particles of claim 45.

51. A beverage bottle obtained from the particles of claim 45.

5 52. A perform obtained from the particles of claim 45